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ATOMIC LAYER OF DEPOSITION OF PT FROM AQUEOUS SOLUTIONS [NIST Docket No. 12-050]

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Abstract

A self-terminating rapid electrodeposition process for controlled growth of Pt monolayer films from a K2PtCl4-NaCl-NaBr electrolyte has been developed that is tantamount to wet atomic layer deposition (ALD). Despite the deposition overpotential being in excess of -1V, Pt deposition is quenched at potentials just negative of proton reduction by an alteration of the double layer structure induced by a saturated surface coverage of underpotential deposited hydrogen, (Hupd). The surface is reactivated for Pt deposition by stepping the potential to more positive values where Hupd is oxidized and fresh sites for adsorption of PtCl4^2- become available. Periodic pulsing of the potential enables sequential deposition of two dimensional (2-D) Pt layers to fabricate films of desired thickness relevant to a range of advanced technologies from catalysis to magnetics and electronics.

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Citations

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References

- 12-050Application

Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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